

Remarks

The Examiner has rejected claim 4 under 35 U.S.C. §112 as being indefinite. Applicant amended the claim to overcome the rejection.

The Examiner has rejected claims 1-4 and 6-8 under 35 U.S.C. §103(a) as being unpatentable over the article "Thermal Stability and Desorption of Group III Nitrides Prepared by Metal Organic Chemical Vapor Deposition" by Ambacher et al. ("Ambacher"). Applicant amended claim 1 to overcome the rejection.

Applicant's invention is directed to a method of growing nitrogenous semiconductor crystal materials corresponding to the form $A_xB_yC_zN_vM_w$ without any abrupt change of the growth regime. Known methods require a two step process involving interruption of the growth of nitrogenous semiconductor strata between the two steps, where temperature is increased. Applicant's invention overcomes the problem associated with the prior art by using a temperature ramp function, where temperature is increased linearly over time. This permits continuous growth during the ramp function resulting in enhanced crystalline quality of the nitrogenous semiconductor stratum.

Ambacher does not disclose, teach, or suggest a method for growing nitrogenous semiconductor crystal materials. Ambacher relates to polycrystalline or epitaxial crystalline layers. For example, Applicant's invention teaches growth of nitrogenous semiconductor crystals start at a low temperature of 530°. At this same temperature, Ambacher shows that polycrystal materials grow. Further, Ambacher does not relate to growing crystal materials over a gradually increasing temperature from this

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low temperature, such as a ramp function. Instead, Ambacher grows polycrystalline materials at fixed temperatures.

The Examiner states that Ambacher discloses that temperature changes affect growth characteristics. Applicant agrees that temperature changes affect growth characteristics, as known methods using a two step process also achieves this result. However, both Ambacher and known methods using the two step process do not disclose a gradually increasing temperature for permitting continuous growth, thereby resulting in enhanced crystalline quality of the nitrogenous semiconductor stratum. The Examiner further states that a difference between Ambacher and Applicant's invention is the continuous growth.

Applicant respectfully submits that this difference between Ambacher and Applicant's invention would not be obvious. Before a reference may be modified in a rejection under 35 U.S.C. §103, some motivation for the artisan to make the modification must be shown. There is no teaching or suggestion in Ambacher to provide a continuous growth of nitrogenous semiconductor crystal material. Although Ambacher does not teach disrupting growth, as the two step process in other known methods require, this does not mean that continuous growth is obvious from reading Ambacher. Obviousness is determined from the teachings or suggestions of a reference and Ambacher needs to teach or suggest a continuous growth in order to render Applicant's invention obvious. Therefore, Ambacher does not provide any reason or logic for the modification suggested by the Examiner. Because Ambacher lacks a teaching of disrupting growth, it is a far leap to interpret this silence to mean

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Ambacher teaches or suggests continuous growth. The person of ordinary skill in the art does not have the current application in front of him/her when considering such modification. Hence, there is no reason why one skilled in the art would modify the prior art to arrive at the claimed invention absent hindsight or having the current application.

Respectfully submitted,



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Clean Copy of Marked Up Claims:

B₁ 1. (Amended) MOCVD process for the initial growth of nitrogenous semiconductor crystal materials in the form of $A_xB_yC_zN_vM_w$ wherein A,B,C, is an element of group II or III, N is nitrogen, M represents an element of group V or VI, and X,Y,Z,W denote the molar fraction of each element of this compound, which are deposited on sapphire, SiC or Si, characterized in that the deposition of these semiconductor materials is performed in a continuous growth process from the first moment of wafer covering up to the achievement of a high-quality stratum on the surface, whereby the growth starts at a low initial growth temperature, which increases by means of a ramp function to the common high growth temperature.

B₂ 4. (Twice Amended) Process according to Claim 1,
characterized by controlling the stress density in the semiconductor crystal by a continuous variation of the growth regime during the initial growth by means of ramp functions.